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BRAINMAPPING UPDATE: A STATUS REPORT FROM TMI

by F. Holmes Atwater, Project Coordinator

F. Holmes (Skip) Atwater, a retired military officer, has been a college instructor, scientific investigator, and behavioral engineer specializing in the design and application of methods for developing advanced human potential. He received a B.S. degree from the University of Nebraska and completed graduate coursework in counseling psychology at the University of Northern Colorado. Mr. Atwater, associated with TMI since 1977, became the Brainmapping Project Coordinator in September of 1988.

“An exciting, dynamic field” is the phrase Skip Atwater used to describe the brainmapping process. He began his presentation by reviewing the origins of TMI’s entry into this field. At the TMI Professional Seminar in 1987, one of the special projects groups began investigating the possibility of an automated, biofeedback Hemi-Sync® system—specifically, a computer that would generate binaural beats based on an individual’s real-time EEG frequencies [see the Topic/Subtopic files: Physiology/Brain–Mapping].

This group’s efforts and recommendations have led to the ongoing TMI Brainmapping Project that Atwater now heads. The Brainmapping Project uses “BEAM” (Brain Electrical Activity Mapping—BEAM is a trademark and a federally registered service mark) equipment consisting of a neurophysiological device which converts the output of a 20-channel electroencephalogram (EEG) into a color-contour map of the electrical activity at the surface of the brain. The BEAM equipment also translates this information into computer readable form, analyzes the information, and displays the results as a stylized color oval image of the head in two dimensions. Subtle electrical variances are displayed in stark contrast. Mr. Atwater noted that the emphasis of the Brainmapping Project is obtaining objective information for the purpose of improving the Hemi-Sync process. The stated goals of the Brainmapping Project are:

- I. To investigate high-resolution topographic brain-wave patterns and specific brain-wave frequency configurations:
 - A. of individuals skilled/practiced in Focus 10 and Focus 12 with the intent of developing improved Hemi-Sync formats based on what is learned.
 - B. of individuals skilled/practiced in HUMAN PLUS, with the intent of developing improved HUMAN PLUS formats.
 - C. in relationship to physiological variables of peripheral warming and sudorific (sweat gland activity) and nonsudorific (other causes) skin potential levels resulting from an individual’s exposure to Hemi-Sync.

II. To provide a brainmapping service to clients of TMI.

The specific BEAM-type instrumentation used in TMI's research is the Neuromap Research SYSTEM-24 (NRS-24). The NRS-24 was selected for a number of reasons: the Neuromap company is a relatively new "up-and-coming" company that is willing to work with TMI on software design, the NRS-24 uses "off-the-shelf" (IBM AT or compatible) components, it is designed to facilitate biofeedback strategies and stimulus-response protocols, and it is far cheaper (20 thousand dollar range vs. 50-70 thousand dollar range) than other systems. Mr. Atwater pointed out that the NRS-24 uses an electrode cap that has 20 channels for EEG readings and 4 channels for reading electrical/muscular activity (to aid in the detection of artifacts, or "false" readings, caused by twitches, eye blinks, etc.). The exact placement of those 24 electrodes is not important in TMI's research, because the focus is on overall patterns, not what's happening "inside the brain."

With that background, Mr. Atwater showed a videotape of a subject being fitted with the NRS-24 cap in the research lab and then went on to a series of overhead transparencies which gave an overview of the research to date. After showing some of the basic data collected by the NRS-24, and the various ways the readings can be displayed on the computer, Mr. Atwater displayed a series of overhead transparencies that indicated the sort of readings that have caused some notice in the research effort.

While cautioning against making broad assumptions, he exhibited topographic color maps of brain activity (during an H-PLUS[®] tape session) that seemed to indicate brain-wave synchrony. Also displayed was a printout of a "gamma burst" (a quick spike in the higher frequencies above Beta—above 22 Hz), that Mr. Atwater said coincided with a subjective "Ah Ha!" experience reported by the subject being brainmapped. He said a number of such "gamma burst/subjective "Ah Ha!" incidents have been observed in several test subjects, and may be an indicator of creative thought. Mr. Atwater suggested that if this pattern continues to be noticed, it might be worth creating a Hemi-Sync pattern that could stimulate the "gamma burst."

Another observation that has been made by members of the Brainmapping Project was graphically displayed. During the specific instance shown to the group, the test subject was reporting a "good Focus 21." The NRS-24 readouts indicated not only was there high amplitude in the 1.5 Hz (deep Delta) and 4 Hz (Theta/Delta) frequency ranges (as the monitors would have suspected), but there was also a strong reading in the 6 Hz (mid-range Theta) frequency range. Mr. Atwater said this 1.5/4/6 Hz pattern has shown up often when subjects are reporting a deep meditative state. Mr. Atwater concluded by noting the process of collecting and analyzing data with the NRS-24 has just begun, but there are already indicators the Brainmapping Project will be of great value to the understanding and refinement of the Hemi-Sync process.

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